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INTRODUCTION TO TRACE ELEMENT CONFERENCE*

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TOTAL parenteral nutrition (TPN) has achieved a firm and important place in the treatment of patients with severe gastrointestinal dysfunction not capable of management by other nutritional therapeutic modalities. The numbers of patients on TPN in and out of hospitals progressively increase. The stressed, poorly nourished patient placed on intravenous nutrition will have special needs for nutrients to replace previous losses and to provide those necessary to permit optimum nutritional rehabilitation. The long-term home TPN patient—often with continuing gastroin-

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testinal fluid losses—must be assured that all essentials are provided in adequate amounts over periods that may extend into decades. The increasing use of TPN in infants, children, and pregnant women further emphasizes the need for information on requirements for all essentials at all periods of growth and development. Inherent in this need for knowledge is assurance that potentially toxic levels of any nutrient, contaminant, or additive are avoided. Bypassing the normal controls of the alimentary tract by parenteral feeding accentuates this problem.

Deficiencies of zinc, copper, chromium, and others of the essential trace minerals have surfaced and have alerted the profession to the need for availability of such nutrients and for new knowledge in this field. The advent of TPN has presented unique opportunities for clinical research on trace mineral deficiencies.

In 1977 the Nutrition Advisory Group of the Department of Food and Nutrition of the American Medical Association (AMA) convened an expert group to review the available knowledge about essential trace mineral requirements. Four major topics were discussed: 1) current knowledge of requirements for trace elements in health and disease, 2) modification of dietary requirements for trace elements and the development of guidelines for IV intake, 3) safe levels of use, including the presence of trace elements as contaminants in parenteral solutions and problems of quality control at the manufacturing level, and 4) need for parenteral trace element formulations in single or multiple combinations and guidelines for the form and concentrations of such formulations. Following the conference, an expert panel developed guidelines for essential trace elements preparations for parenteral use with special reference to zinc, copper, chromium, and manganese. Parenteral solutions of other essential trace elements—e.g., iron, iodine, cobalt (as vitamin B_{12})—were already available commercially. The AMA guidelines were submitted to the Food and Drug Administration FDA in December 1978 and published in *The Journal of the American Medical Association* in May 1979.*

These AMA Guidelines catalyzed the production by phamaceutical companies of sterile solutions of salts of zinc, copper, manganese, and chromium. Their widespread use in TPN solutions quickly followed, and experience with their use attests to their value in maintaining acceptable blood and tissue concentrations in clinical use.

*AMA Department of Food and Nutrition: Guidelines for Essential Trace Element Preparations for Parenteral Use. *J.A.M.A. 241:* 2051-54, 1979.

Since these guidelines were prepared, significant advancements have been made in our knowledge of the qualitative and quantitative requirements for the various trace minerals in a variety of clinical conditions and for different ages. Appreciable information has accumulated on human needs for selenium, and there is now a well-studied case of molybdenum deficiency.

In September 1982 the AMA and The New York Academy of Medicine convened a second Working Conference on Parenteral Trace Elements to review data and clinical experience. The trace minerals reviewed and discussed were: zinc, copper, chromium, selenium, iron, molybdenum, manganese, fluoride, vanadium, iodine, nickel, arsenic, boron, and silicon. The potential toxicity of some of these and of lead, mercury, cadmium, and aluminum were reviewed. The papers presented at that conference are published in this issue of *The Bulletin of The New York Academy of Medicine*. The information herein presented will form the basis for a new set of guidelines for essential trace element preparations for parenteral use that should extend and advance those of the guidelines of 1977.

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